

THE CLAIMS

1. An integral gasketed filtration cassette structure comprising:

- (a) a filtration cassette comprising a multilaminate array of sheet members of generally rectangular and generally planar shape with main top and bottom surfaces, wherein the sheet members include in sequence in the array a terminal end plate, a first retentate sheet, a first filter sheet, a permeate sheet, a second filter sheet, and a second retentate sheet, and a second terminal end plate, wherein each of the sheet members in the array has at least one inlet basin opening at one end thereof, and at least one outlet basin opening at an opposite end thereof, with at least one permeate passage opening;

each of the first and second retentate sheets having at least one channel opening therein, wherein each channel opening extends longitudinally between the inlet and outlet basin openings of the sheets in the array and is open through the entire thickness of the retentate sheet, and with each of the first and second retentate sheets being bonded to an adjacent filter sheet about peripheral end and side portions thereof, with their basin openings and permeate passage openings in register with one another, and arranged to permit flow of filtrate through the channel openings of the retentate sheet between the inlet and outlet basin openings to permit permeate flow through the filter sheet to the permeate sheet to the permeate passage openings;

wherein each of the filter sheets is secured at its peripheral portions on a face thereof opposite the retentate sheet, to the permeate sheet;

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(b) at least one thin gasket layer bonded to a surface of said filtration cassette and forming an integral unitary structure with said filtration cassette, wherein said thin gasket layer comprises an elastomeric material for forming a fluid-tight seal between the filtration cassette and an adjacent structure when engaged therewith.

2. The integral filtration cassette structure of claim 1, wherein the thin gasket layer comprises an elastomeric material having a hardness in the range from about 30 to about 80 durometers.

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3. The integral filtration cassette structure of claim 1, wherein the thin gasket layer comprises an elastomeric material having a hardness in the range from about 40 to about 60 durometers.

4. The integral filtration cassette structure of claim 1, wherein the thin gasket layer has a thickness in the range from about 0.01 inch to about 0.1 inch.

5. The integral filtration cassette structure of claim 1, wherein the thin gasket layer has a thickness in the range from about 0.02 inch to about 0.06 inch.

6. The integral filtration cassette structure of claim 1, wherein the thin gasket layer has a temperature resistance at least within the temperature range from about 0°C to about 70°C.

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7. The integral filtration cassette structure of claim 1, wherein the thin gasket layer has a temperature resistance within the temperature range from about -10°C to about 150°C.
8. The integral filtration cassette structure of claim 1, wherein the thin gasket layer fully encapsulates said filtration cassette.
9. The integral filtration cassette structure of claim 1, wherein the thin gasket layer partially covers the surface of said filtration cassette.
10. The integral filtration cassette structure of claim 1, wherein the thin gasket layer comprises a material selected from the group consisting of silicone, ethylenepropylenedienemonomer (EPDM), viton, polyurethane, polypropylene, polyethylene, polyvinylchloride, polyester, epoxy, ethylvinylacetate, bunnas, and styrene butadiene.
11. The integral filtration cassette structure of claim 1, wherein the thin gasket layer comprises silicone.
12. The integral filtration cassette structure of claim 1, wherein the thin gasket layer is securely bonded onto the surface of said filtration cassette by a method selected from the group consisting of molding, adhering, welding, and spray coating.

13. The integral filtration cassette structure of claim 1, wherein the thin gasket layer is molded onto the surface of said filtration cassette.

14. The integral filtration cassette structure of claim 1, wherein the thin gasket layer is adhered onto the surface of said filtration cassette.

15. The integral filtration cassette structure of claim 1, wherein the securely bonded onto the surface of the said filtration cassette by radio-frequency welding, ultra sonic welding, or heat welding.

16. The integral filtration cassette structure of claim 1, further comprising a feed material inlet port communicating with said at least one inlet basin opening, and a retentate outlet port communicating with said at least one outlet basin opening, wherein the inlet and outlet ports are diagonally opposite one another on said cassette.

17. A stacked cassette filter including a stacked assembly of integral gasketed filtration cassette structures, each comprising:

- (a) a filtration cassette comprising a multilaminate array of sheet members of generally rectangular and generally planar shape with main top and bottom surfaces, wherein the sheet members include in sequence in the array a first retentate sheet, a first filter sheet, a permeate sheet, a second filter sheet, and a second retentate sheet, wherein each of the sheet members in the array has at least

one inlet basin opening at one end thereof, and at least one outlet basin opening at an opposite end thereof, with at least one permeate passage opening:

each of the first and second retentate sheets having at least one channel opening therein, wherein each channel opening extends longitudinally between the inlet and outlet basin openings of the sheets in the array and is open through the entire thickness of the retentate sheet, and with each of the first and second retentate sheets being bonded to an adjacent filter sheet about peripheral end and side portions thereof, with their basin openings and permeate passage openings in register with one another, and arranged to permit flow of filtrate through the channel openings of the retentate sheet between the inlet and outlet basin openings to permit permeate flow through the filter sheet to the permeate sheet to the permeate passage openings;

wherein each of the filter sheets is secured at its peripheral portions on a face thereof opposite the retentate sheet, to the permeate sheet;

- (b) at least one thin gasket layer bonded onto a surface of said filtration cassette and forming an integral unitary structure with said filtration cassette, wherein said thin gasket layer comprises an elastomeric material for forming a fluid-tight seal between the filtration cassette and an adjacent structure when engaged therewith.

18. A filter assembly comprising:

- (a) a first end plate;

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